SOIL SURVEY OF THE ABBEVILLE AREA, SOUTH CAROLINA.

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LOCATION AND BOUNDARIES OF THE AREA.

The area surveyed is the territory covered by the Abbeville sheet of the U. S. Geological Survey. This sheet includes the land lying between the parallels of 34° and 34° 30′ north latitude and the meridians of 82° and 82° 30′ west longitude. It is rectangular in shape, being about 29 miles in extent east and west and 35 miles north and south, and comprises about 1,006 square miles, or 644,160 acres.

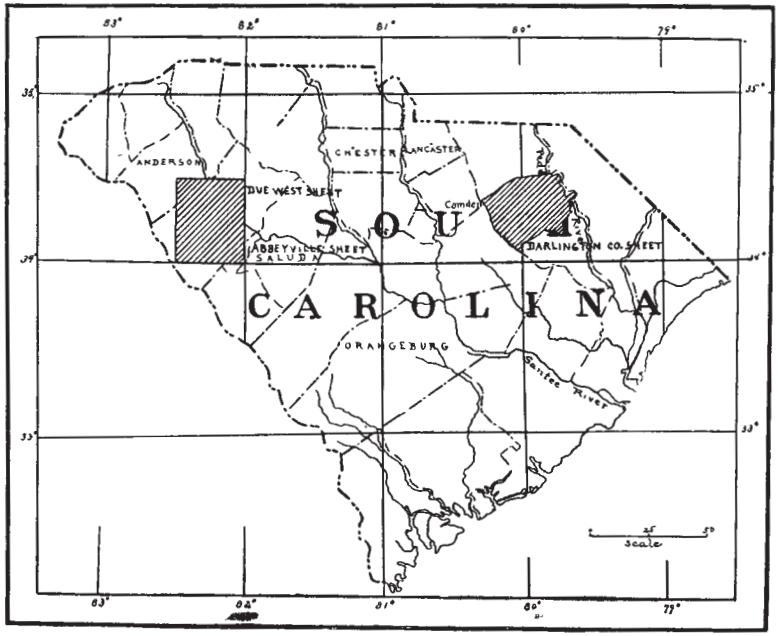

FIG. 6.—Sketch map showing areas surveyed in South Carolina.

Within the area are included about 400 square miles of Abbeville County, 380 square miles of Greenwood County, 170 square miles of Laurens County, and 50 square miles of Anderson County. The town of Laurens is situated in the extreme northeast corner of the sheet, and the village of Mount Carmel is just one-half mile west of the southwest corner.

As it was necessary to revise the road system to bring the base map up to date, the map has been redrawn and the contours omitted.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

The territory covered by this survey was originally included in the old District of Ninetysix, which comprised the present counties of Abbeville, Greenwood, Laurens, Newberry, Edgefield, and Saluda, with the district court-house at Old Cambridge, where the "Star" fort is located and where the battle of Ninetysix took place.

The land upon which the present town of Abbeville is located was purchased from Gen. Andrew Pickens, who lived at Fort Pickens, near the "big spring," now within the corporate limits of the town. The town, however, was named after the town of Abbeville, France, by Dr. John de la Howe, who, emigrating from that place about 1765, had established a large plantation on Little River. The county of Abbeville was set off in 1800.

The earliest products which this part of the country gave to commerce were the skins and furs of wild animals. Between 1740 and 1750 the "cow-pen keepers" and "cow drivers," led here by the representations of the trappers, hunters, and Indian traders, built their cabins along the bottom pastures and made large inclosures, into which their numerous herds were driven for marking and handling. This business was quite extensive, and large numbers of cattle were annually driven to the markets of Charleston, Philadelphia, and New York. Horse raising was largely engaged in, and so highly were the qualities of the Carolina horse of that early day esteemed that a statute of the provincial legislature forbade the introduction of the inferior horses of Virginia and other plantations.

The region possesses just such features of climate, topography, soil, and vegetation as would attract and fix upon its hills and valleys the energetic race which was the first to clear away its forests and appropriate its vast agricultural resources. Consequently, around the "cow pens" of the stock drivers the agricultural settlers soon appeared.

The first settlement of this kind was made in 1756, near Calhouns Mill, by William and Patrick Calhoun, John Noble, and other hardy pioneers who had emigrated from Virginia. This settlement was composed of the best educated men and was perhaps the most thrifty and prosperous of any of the early ones. It was almost annihilated, however, in 1760, by an Indian massacre, which took place near Lower Long Cane Church.

The next settlement was made by a company of 200 French Huguenots, under the leadership of Rev. Jean Louis Gibbert, who landed at a place called Buford and marched overland to Bordeaux. A fort was built here and 60 acres were set off for each man's farm.

The third settlement of any importance was that of the Scotch-Irish

Presbyterians, in the vicinity of Long Cane and Curltail creeks. This settlement grew very rapidly and at the beginning of the Revolutionary war contained nearly as many whites as in 1860.

The original forest growth was quite different from the forests of the present time. On the highlands the oak, hickory, and chestnut were of large growth and stood far apart. There was no underbrush and the woods were carpeted with grass and the wild pea vine. Along the streams and in the valleys the distinctive growth was willow, beech, birch, black walnut, ash, poplar, and gum. The cane also flourished best here, although it often grew upon the higher ground. The cane growth was the standard by which the early settlers estimated the value of the land. If it grew only to the height of a man's head, the land was esteemed ordinary, while a growth of from 20 to 30 feet indicated the highest fertility.

The principal early agricultural crops of this region were wheat, corn, hemp, and grapes, raised exclusively for home consumption. The cultivation of tobacco was also engaged in, but was restricted by the difficulty of marketing such a bulky article over the rough and poorly constructed roads. The tobacco was commonly packed in hogsheads, and with spindles fastened to the heads and shafts attached it was drawn, or rather rolled, to the Charleston market. Indigo, too, was one of the first commercial articles produced, but the raising of it has long since ceased, owing to cheaper production elsewhere.

The culture of silk worms was introduced to some extent by the early French settlers, and has been carried on in a limited way to the present time. Silk culture on a commercial scale for this region is now being agitated, and it would perhaps prove a thriving industry, as the mulberry grows to perfection here.

Not only the forests, but the cultivated fields as well, present a very different aspect now from what they did after the country was first opened up. It was then new and beautiful and as remarkable for the luxuriant richness of its landscape as it is now for the striking features of its rolling hills and long, narrow valleys. The original forest has disappeared almost entirely, and has been replaced by scrubby oaks, by underbrush, and by the shortleaf pines of the abandoned fields. The chestnut and chestnut oak have been dying out for the past sixty years, and the cane has likewise almost disappeared.

Since the introduction of cotton a century ago the system of farming has been greatly changed. Instead of raising cattle and horses and wheat and corn, as was once done, the culture of cotton has so superseded all other agricultural pursuits that the traveler might well be of opinion that no other crops could be profitably grown.

CLIMATE.

The shorter seasons and lower temperatures of the Piedmont region, as compared with those lying immediately south of it, are attributable

in part to differences of elevation or of latitude, these differences being themselves slight. Other influences are proximity to the mountains, and still more the heavy clay soils and subsoils, more retentive of moisture and therefore colder and later in spring than the lighter sandy soils of the Coastal Plain. Cotton planting is about ten days later than in the lower country. Cotton also blooms later, but by a lesser period, and the same is true of the opening and picking season, showing that although it starts later it grows faster, passing more rapidly through its various stages to maturity.

The growing season in this area may be considered to be approximately seven and one-half months. Killing frosts in the spring are not expected later than March 22, nor in the autumn before November 10. The following table, compiled from the South Carolina section of the climate and crop service of the Weather Bureau, shows the normal monthly and annual temperature and precipitation at Greenwood, which is centrally located in the area. The figures are based on records covering a period of thirteen years.

Normal monthly and annual temperature and precipitation.

Month.	Greenwood.		Month.	Greenwood.	
	Temperature.	Precipitation.		Temperature	Precipitation
	°F.	*Inches.*		°F.	*Inches.*
January	41.8	3.76	August	78.6	5.52
February	43.1	4.89	September	73.1	4.56
March	53.5	4.31	October	62.3	2.78
April	61.3	3.91	November	52.1	3.04
May	71.6	3.80	December	42.7	3.24
June	78.8	4.13	Year	61.6	48.86
July	79.8	4.92			

PHYSIOGRAPHY AND GEOLOGY.

The area surveyed lies in the Piedmont region. The surface of the country is a gently undulating plain that becomes more rolling as it approaches the rivers and larger streams, and is finally broken and hilly above the bottoms and narrow low grounds through which the many water courses find their passage.

The region is well drained by these numerous streams, which have a marked parallelism of course from northwest to southeast. There are two systems of drainage: the one through the Saluda River and its tributaries to the ocean by way of the Congaree, and the other through Long Cane Creek and Little River by way of the Savannah. These two systems are divided by a watershed that extends in a southeast direction from Honeapath to Ninetysix.

The elevation of 16 different points in the area, ranging from 570 feet at Ninetysix to 896 feet at Craytonville, gives a mean elevation

of 657 feet. The general rise in the surface from the southeastern to the northwestern corner is approximately 8 feet to the mile. The rise in the beds of the streams for the same distance is about the same, although their courses are marked by numerous shoals and small waterfalls. These waterfalls on the larger streams mark the sites of many gristmills now in operation and of many more that have gone to decay through lack of use since the growing of cotton has largely taken the place of grain. At Ware Shoals, on the Saluda River, for a distance of 3 miles the water comes tumbling over the granite rocks, which are so close together that a man can step from one to another. In this distance there is a fall of 68 feet, and plans are now nearing completion to build a $500,000 cotton factory on this site, and thus to utilize the enormous energy that has heretofore been literally running to waste.

The geology of this area is that characterizing generally the Piedmont region of the Atlantic slope, which extends from Maryland to Alabama. The rocks of igneous origin consist of granites, gneisses, and dioritic porphyries, and of metamorphic origin, of schists and slates. All these rocks represent the older portions of the earth's crust, and have been more or less altered in position and composition by the long-continued and subtle forces of nature.

The granitic rocks underlie by far the largest portion of the area. They are the basis of all the soils in the northern half of it. The dioritic porphyries come to the surface in three distinct and widely separated regions; i. e., in the vicinity of Calhouns Mills, between Gaines and Epworth, and 4 miles south of Hodges.

The schists and slates usually outcrop in dikes, but in the region of Kirksey the slates give rise to the soils over quite an extended area.

In but a comparatively small proportion of the area in this section is cultivation impeded by the rocks prevalent there. This is due to the remarkable extent and depth of the decomposition of these rocks. Wells dug to a depth of 30 or 40 feet require no implements for excavation except a pick and shovel. Frequently so thorough is the decomposition that the sides of railroad cuts might be mistaken for a heap of transported material did not the existence of seams and quartz veins, which may always be traced on the fresh surfaces, make it certain that the rock had rotted in place. The quartz veins vary in width from a few inches to several feet, but where even a small vein outcrops the surface is covered with the quartz fragments, or "flint rocks," as they are locally called, for perhaps 20 yards on each side, thus indicating that many feet of the original rock have been decomposed in the formation of the soil there found. Large bowlders of granite and "nigger heads" of diorite are frequently found scattered here and there. Why these rocks should not have been decomposed with the others is a mooted question, but it was probably because of

some peculiar chemical or mechanical combination of the constituents which made the rocks more resistant to weathering agencies.

The mineral resources of the area are as yet largely undeveloped. Several manganese mines have been opened up during the present summer about 5 miles south of Greenwood. The ore was found to run in veins instead of pockets and to be of considerable extent, but it did not analyze quite high enough to be of commercial value with the necessary long shipments. Small amounts of iron, copper, nickel, cobalt, and pyrites are found associated with the manganese, but not in sufficient quantity to warrant the mining of them.

Gold-bearing ore seems to be pretty generally distributed over the area. In the vicinity of Little Mountain, south of Abbeville, several mines have been opened and some gold taken out, but a large percentage of the ore is not rich enough to be economically worked.

SOILS.

The soils of this area have been classified according to their texture into the following types: Cecil clay, Cecil sandy loam, Durham sandy loam, Iredell clay loam, and Davie clay loam. With the exception of the Iredell clay loam the types have a subsoil that is quite similar, being a very stiff, compact clay with a color varying from a dark red to a light yellow, and containing slightly varying amounts of sand and quartz fragments. The surface foot of these types, however, shows distinct and marked differences, and it has been largely upon this basis that the above classification has been made.

The soils are all residual, having been formed from the disintegration and decomposition of the rocks underlying them. In a general way it may be said that the sandy loams occupy the more elevated and more nearly level portions of the area, while the clay and clay loams are found on the slopes.

Areas of different soils.

Soil.	Due West sheet	Abbeville sheet.	Total area.	Proportional extent.
	Acres.	*Acres.*	*Acres.*	*Per cent.*
Cecil clay	138,880	194,112	332,992	51.7
Cecil sandy loam	155,072	81,216	236,288	36.7
Durham sandy loam	21,440	6,400	27,840	4.3
Davie clay loam	.....	25,856	25,856	4.0
Iredell clay loam	4,096	10,752	14,848	2.3
Meadow	1,856	4,480	6,336	1.0
Total	321,344	322,816	644,160	.....

CECIL CLAY.

The Cecil clay is the characteristic red clay land of the Piedmont plateau. It consists of a red clay loam with a depth of 6 or 8 inches, underlain by a stiff, heavy reddish clay increasing in compactness with depth. Both the soil and subsoil contain some sand, and larger

quartz fragments are found scattered through them to greater or less extent, depending upon the frequency of occurrence of the quartz veins in the decomposed rock.

The Cecil clay covers about 52 per cent of the area. In the southern half, especially in the region north and east of Abbeville, it largely predominates. It is usually found occupying slopes of varying declivity, the loose sand having been washed away as fast as it was released from the tenacious clay. A glance at the map will show that the Cecil clay very generally follows the stream courses, covering an area from 2 to 3 miles wide on each side of the streams in their lower courses and gradually diminishing in width as the headwaters of the streams approach the higher and less rolling areas of land. This fact is quite noticeable in the case of Long Cane Creek and Little River.

This soil is considered the strongest and most productive type of the area. It is more retentive of moisture than the sandy soils, and for this reason is better able to withstand seasons of drought, as is evidenced by the rich deep-green color of the crops growing upon it during such times. The surface has a tendency to dry and form a crust after rains, and this should be broken by cultivation as soon as possible to allow the young plants to push through, and to provide a mulch which may assist in preventing excessive evaporation of the soil water.

In the Abbeville area the Cecil clay is used chiefly for the production of cotton, yielding from 200 to 250 pounds of lint per acre. Corn yields range from 15 to 20 bushels per acre, wheat from 8 to 12 bushels, and oats from 18 to 24 bushels per acre. The cowpea does fairly well on this soil, but when the season is not too dry it grows better on the sandier lands.

The following table of mechanical analyses of this soil shows its composition:

Mechanical analyses of Cecil clay.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6975	1 mile S. of Ninety-six.	Reddish-brown loam, 0 to 8 inches.	0.74	4.86	13.88	10.92	21.56	16.54	14.86	17.38
6973	4 miles E. of Abbeville.	Reddish-brown clay loam, 0 to 8 inches.	.60	1.50	5.12	5.04	18.10	11.62	21.22	37.40
6976	Subsoil of 6975.....	Friable red clay, 8 to 36 inches.	.33	.86	3.74	2.88	6.66	7.62	35.76	42.20
6974	Subsoil of 6973.....	Red clay, 8 to 36 inches.	.20	.80	2 58	2.74	11.32	6.60	29.92	45.96

CECIL SANDY LOAM.

The Cecil sandy loam consists of a brown or dark-gray sandy loam, from 6 to 12 inches deep. The sand is medium to coarse rather than fine, the rocks from which it is derived being usually coarse grained. The subsoil is red and very similar to that of the Cecil clay, but usually has more sand mixed with it, making it somewhat less compact. Quartz fragments are found scattered through both soil and subsoil.

The type is distributed over the whole area, although it is more prevalent in the northern part, which is less broken than the southern. It occurs in areas of varying extent, depending upon the topography. It usually occupies the ridges and the levels, having apparently been formed by the gradual separation of the siliceous and argillaceous material formed by the disintegration and decomposition of the underlying rocks. This has presumably been effected by a process of lixiviation, during which the rain water, owing to the general levelness of the surface, has not been carried off, but has percolated downward, carrying the finer clay particles with it through the interstices of the larger sand particles. These clay particles have a marked tendency to be held in suspension, as is shown by the general turbidity of the streams which cut through the clay soils.

On the slopes where the Cecil clay is found the sand, as well as a part of the clay, has been removed in the process of erosion by the falling rains. As might be expected, with the clearing of the land and the washing of the slopes the areas of the Cecil sandy loam are gradually decreasing, while the areas of the Cecil clay is proportionately increasing.

Owing to the easy cultivation of this type of soil it is often preferred to the Cecil clay, although in dry weather the cotton and corn grown on it show a tendency to "burn" much more quickly. The type is better adapted to cotton than to the grains. The average yield of cotton is from 175 to 225 pounds of lint per acre. Corn and wheat yield from 8 to 12 bushels, and oats about 15 bushels per acre. Peaches, plums, apples, and cherries grow very well both on this type and on the Cecil clay. The truck crops and tobacco would be well adapted to this soil, especially in the areas where the greater depth of loam occurs.

The table on page 281 shows the results of mechanical analyses of this type.

Mechanical analyses of Cecil sandy loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct*	*P. ct*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6977	2 miles NW. of Abbeville.	Brown sandy loam, 0 to 12 inches.	0.66	7.76	21.68	11.90	23.52	12.58	15.40	7.22
6979	2 miles NE. of Erwin's mill.	Sandy loam, 0 to 8 inches.	1.19	9.20	18.80	12.00	20.92	15.30	15.60	8.08
6980	Subsoil of 6979....	Red clay loam, 8 to 36 inches.	.52	5.00	9.56	5.52	10.66	7.12	21.84	40.30
6978	Subsoil of 6977....	Reddish clay, 12 to 36 inches.	.37	4.42	11.90	6.20	10.52	5.68	18.46	42.82

DURHAM SANDY LOAM.

The Durham sandy loam is the sandiest type of soil in the area. It consists of a grayish sandy soil 10 to 15 inches deep, the whole consisting of rather coarse material and the surface few inches being almost pure sand. The subsoil is a yellow or mottled clay containing some sand, but becoming heavier with depth. Quartz fragments occur in this soil with the same frequency as in the two soils already described. It is found in two comparatively large areas, one around Hodges and the other in the vicinity of Craytonville. Many areas of small extent also occur. It is usually confined to the higher level areas, but is frequently found adjacent to the streams in their upper courses. The soil has been derived from the coarser-grained granites and gneisses and other igneous rocks, and has been formed by a process similar to that set forth in the description of the Cecil sandy loam.

At the present time the Durham sandy loam is farmed almost exclusively to cotton and corn, yielding about 200 pounds per acre of the former and 10 bushels of the latter. Because of its extremely sandy nature it has a tendency to leach and is quite subject to drought. Cowpeas and sweet potatoes do quite well on it. Some very fine varieties of grapes are also grown on it, and the gravelly portions are well adapted to the growth of pear trees. It is typically a melon and bright-tobacco soil. The table on page 282 shows its texture.

Mechanical analyses of Durham sandy loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct*	*P. ct.*	*P. ct.*
6985	5½ miles N. of Abbeville.	Coarse gray sandy loam, 0 to 14 inches.	0.46	3.02	15.44	12.24	29.14	20.68	11.22	7.98
6987	1 mile SW. of Hodges.	Grayish sandy loam, 0 to 12 inches.	1.85	13.06	19.70	9.48	15.56	15.22	18.66	8.30
6986	Subsoil of 6985...	Mottled red and yellow clay, 14 to 36 inches.	.37	2.06	9.96	5.82	19.40	15.36	17.20	30.36
6988	Subsoil of 6987...	Yellowish clay loam, 12 to 36 inches.	.19	5.78	8.42	4.22	7.18	6 10	21.64	46.74

IREDELL CLAY LOAM.

The Iredell clay loam is what is locally known as "flat-woods" or "buckshot" land. The soil is a dark-brown loam, sometimes almost black, from 6 to 8 inches deep. In places it is quite sandy, and could almost be classed as a sandy loam. The subsoil is a yellowish-brown, stiff, very tenacious, waxy clay, grading into the undecomposed rock at a depth of about 4 feet. Small nodules of iron carbonate, which give rise to the appellation of "buckshot" lands, occur scattered through the surface foot of soil.

The Iredell clay loam is the product of the weathering of the dioritic porphyries, which are the heavy, dark-colored, and usually fine-grained rocks of the Piedmont region. Portions of these undecomposed rocks, called "niggerheads," are found scattered over the surface in considerable quantities. This soil is found in three principal sections of the area, where the parent rocks outcrop. Besides these three sections small, irregular patches occur in other places.

The flat, even configuration of the surface of this type, and the impervious nature of the subsoil, naturally interfere with drainage, an interference, however, not at all beyond remedy, as the fall for properly constructed drains and outlets is ample. Because much of this land requires drainage and is difficult to work it has in the past received little attention.

There has been a popular belief that this soil contained an excess of lime. To prove or disprove this, a sample was sent to the laboratory for a chemical analysis, and the results obtained as shown on the next page.

Sample.	Calcium oxide.	Magnesium oxide.
	Per cent.	*Per cent.*
Soil, 0 to 7 inches	0.20	0.28
Subsoil, 7 to 36 inches	.32	.14

Neither sample effervesced with hydrochloric acid, so that it is certain that carbonates of lime or magnesia are not present in any appreciable amounts. The figures given for lime can not be regarded as excessive, as the content of many of our very best soils about equals these figures. The proportion of magnesia to lime, however, is somewhat higher than is customarily the case, but the absolute amount of either can in no way be injurious to plant growth.

This soil is better adapted to growing grain and grass than cotton, the latter having a persistent tendency to rust. Wheat, corn, oats, peas, and clover are grown with very fair results. Subsoiling on this land has proved very beneficial, the good results showing for several years afterwards. Its productiveness could be increased by improved methods of cultivation, thorough drainage, deepening of the arable soil by judicious plowing, and by the addition of a liberal supply of green manure or well-rotted stable manure to provide humus and improve the soil texture.

Mechanical analyses of Iredell clay loam.

[Fine earth.]

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6991	4½ miles NE. of Abbeville.	Sandy loam, 0 to 10 inches.	1.19	7.04	10.28	7.10	28.60	28.54	13.12	5.32
6993	4 miles S. of Hodges.	Grayish-brown sandy loam, 0 to 10 inches.	.67	6.24	8.28	5.12	19.84	23.74	27.74	9.14
6989	9 miles SW. of Abbeville.	Sandy loam, 0 to 7 inches.	1.08	7.24	16.26	10.48	21.06	15.06	14.28	14.76
6992	Subsoil of 6991	Stiff yellowish-brown clay, 10 to 36 inches.	.75	1.44	2.36	3.22	15.04	14.30	26.34	37.24
6990	Subsoil of 6989	Yellowish-brown sticky clay, 7 to 36 inches.	.81	.86	2.04	1.74	4.30	5.42	27.86	57.72
6994	Subsoil of 6993	Stiff waxy clay, 10 to 36 inches.	1.18	.76	1.86	1.48	5.18	7.08	22.12	61.64

DAVIE CLAY LOAM.

The Davie clay loam consists of a light-gray, fine, rather compact sandy loam, having a depth varying from 5 to 10 inches, beneath which

is a reddish clay subsoil, quite friable to a depth of 30 inches on account of its content of fine sand. Below this depth the clay contains less sand and becomes stiff and compact. Quartz fragments from the smallest particles up to pieces as large as a man's head are associated with both the soil and subsoil.

The Davie clay loam, locally known as "white land," is confined to the southern half of the area, and occurs for the most part in long, narrow belts. It is derived from the talc schists and talcose slates that outcrop in numerous dikes. As these dikes have no regularity of outcrop, the soils have no uniform topography, but are found both on the ridges and on the slopes.

A somewhat different phase of this type is found in the vicinity of Kirksey, where on the more level areas, the soil has a slightly greater depth and a little finer and more silty texture. The subsoil has frequently a yellow color, though its textural difference is very slight. The soil of this phase of the type is derived from the soft talcose slates instead of from the talc schists.

The Davie clay loam has about the same value for cotton production as the Cecil sandy loam. Where the loamy soil has a maximum depth corn and oats seem particularly adapted to it, the large amount of fine sand and silt in the subsoil permitting the deeper penetration of the roots.

Below is given a table containing mechanical analyses of samples of this soil type:

Mechanical analyses of Davie clay loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
6981	5 miles S. of Abbeville.	Grayish fine sandy loam, 0 to 7 inches.	0.58	2.88	5.82	4.40	17.52	48.06	12.84	8.18
6983	8 miles S. of Abbeville.	Fine sandy loam, 0 to 8 inches.	1.85	2.04	4.72	2.74	10.86	44.14	26.04	8.50
6982	Subsoil of 6981.....	Red clay, 7 to 36 inches.	.48	.60	2.02	1.80	9.60	31.10	15.32	39.50
6984	Subsoil of 6983.....	Reddish clay, with fine sand, 8 to 36 inches.	.23	1.02	1.64	1.30	4.18	23.42	25.96	41.78

MEADOW.

Along nearly all the streams, both large and small, there are strips of bottom land varying in width from a few rods to a quarter of a mile. These lands have been formed from the material washed from the

slopes above and deposited as sediment in the stream valleys. They have no uniform texture, but range from a coarse sandy loam to a fine clay loam. They are deep soils and very productive, and are usually planted to corn, which will yield as much as 40 bushels to the acre. Excellent pasture, consisting of Bermuda grass, crab grass, swamp grass, and lespedeza, or Japan clover, is also found in them.

Their cultivation, however, is very uncertain, and is becoming more so, owing to the frequent overflows to which they are subject. The stream courses are allowed to become obstructed by logs and brush and gradually fill up, so that every little freshet is liable to inundate these lands to the extent of injuring and often destroying the growing crops.

From careful measurements, and observation the channel of the Saluda River is found to be filling up at the rate of 3 inches per year and those of the smaller streams at even a more rapid rate. The preservation of these fertile bottom lands is a question of no little importance to the land owners. It is thought that by a cooperative and systematic plan of keeping the borders of the streams clear of brush and trees and the streams themselves free from débris the destructive overflows could be largely prevented.

WASHING AND GULLYING.

The red clay soils of the Piedmont region have a marked tendency to wash and gully. This is due partly to their structure—compactness and fineness of the particles—which prevents the falling water from entering them, and more largely to the hilly character of the country. The washing is not so destructive of the fertility as it would be if the soils were not formed from the rocks rotting in place, thus including at every depth all the varied elements of the parent rock. Thus it happens that the earth from the bottom of deep wells, usually barren elsewhere, when spread over the surface is at once productive.

Where cleared land is neglected the washing soon begins, and in an almost incredibly short time it has become so gullied that cultivation can not be continued. These gullies are often 20 or 30 feet deep, with perpendicular sides. They are narrow and short, extending only to the bottom of the slopes. In several places gates have been hung at the lower end and the gullies used as night inclosures for stock.

Within the past fifteen years remedial measures for the washing of the land have been attempted, and have, in a large degree, proven successful. The most common practice is that of terracing the land on the steeper slopes and running horizontal ditches on the slopes of less declivity. These terraces and ditches can be laid off with an ordinary carpenter's level and straight-edge, but more rapidly and accurately with a surveyor's level. One man with the instrument, another with the rod, and a third with a hoe to mark the course of

the ditch, can lay off from 15 to 20 acres a day. A team with a ditching plow can throw up the ditches on 8 or 10 acres a day, the number of ditches, of course, depending upon the steepness of the slope. The average total cost for ditching should not exceed 50 cents per acre. The ditches should have a slight fall toward both ends, and should always be kept in good repair. Intelligently made, the ditches have been very successful, but unskillfully made, they often do more harm than good. The hillside terrace or ditch systems, with their method of contour or horizontal cultivation, together with the introduction of grasses whose roots have a tendency to mat and bind together the soil particles, will ultimately prove the salvation of much land that would otherwise be wasted.

AGRICULTURAL METHODS.

The system of farming has few variations. One principal crop is grown, and that is cotton. The fields are plowed and cultivated almost entirely with one-horse plows, the use of the turning plow and subsoiler being practically unknown. The heavy clay lands are seldom stirred below a depth of 5 inches. This is unfortunate, as deep plowing would establish more thorough drainage and form a better seed-bed. Deeper plowing is not practiced because such treatment is considered too expensive, the work animals and implements not being adapted to such cultivation of the heavy clay lands. The present demand is for light lands of easy tillage, whose recognized deficiency of fertility may be at once supplied by the use of commercial fertilizers. The aim is simply to supply the food needed by the growing crop, with little or no view to permanent improvement of the land.

The use of barnyard manure is very limited; so few cattle are kept and so little fodder and straw grown that what little manure is made is used on the garden patches, and the general field application of it is not thought of. The use of commercial fertilizers, however, is extensive. A complete fertilizer generally proves more profitable than one containing only one or two of the constituents, and the home mixing of these is found to be the most economical. Acid phosphate, kainit, guano, and cotton-seed meal are the forms generally used. The proportions of these are largely determined by their relative cost. It is customary for each farmer to make his own formulas, and apply the fertilizer at a rate to meet the demands of his land. An average mixture consists of 1,000 pounds of acid phosphate, 400 pounds of kainit, and 600 pounds of cotton-seed meal. This is applied at the rate of from 200 to 400 pounds per acre. For use on the clay lands, which are usually not so deficient in potash, the amount of kainit is somewhat decreased.

Fifteen to twenty years ago the growing of grains—corn, oats, and wheat—was quite extensive and profitable, the yields being then nearly

double what they are now. The present low yields are ascribed to seasonal differences, but the true cause is more likely due to the poor structural condition of the lands resulting from the long-continued cropping of cotton.

The corn leaves are usually "pulled," tied in small bundles, and allowed to cure in the field. Later the ears are shucked and the stalks left standing on the ground. The great wastefulness of this method is beginning to be appreciated, and the custom of cutting and shocking the fodder, thus saving the whole of the plant for feed, is gradually being adopted.

The rotation of crops is nowhere reduced to a system. The land is planted in cotton for four or five years and then sown to grain, usually corn and cowpeas, the latter being planted in the row and cut and dried for hay after the corn is harvested. Wheat and oats are sown in the fall and harvested about the 1st of June; the stubble ground is then sown to cowpeas, which ripen before frost. The clean culture of the cotton leaves the land free from weeds, and after one season's crop of small grain is taken off the culture of cotton is resumed. The ratio of the price of cotton to that of wheat and corn determines more than anything else the succession of crops.

Fallowing forms no part of the system of culture. The "old fields" are preferred in many instances to the woodlands, and are being cleared of the short-leaf pine which covers them and replanted. The wood is used for fuel, either at the cotton gins or is sold to the cotton factories for about $1.20 per cord, delivered. These lands produce fairly well and require less fertilizer than the cultivated fields. One of the principal reasons for abandoning these lands in the first place was the gullies produced by the unskillful use of the plow and the general absence of methods of preventing the washing of the soils.

AGRICULTURAL CONDITIONS.

The same general lines of agricultural operations have been carried on in this area since the time of its first settlement. There have been periods when one set of conditions has brought about some changes in the usual practices, but these changes have been slight and of short duration.

General farming, it may be said, has always been the vocation of the rural classes. This is because the soil and climate, the natural factors in the development of an agricultural community, have been most conducive to that form of agricultural industry.

As the civil war wrought great changes in the social and economic conditions of the country, the agricultural conditions were likewise greatly affected. The "old prosperity" of antebellum days has been gradually replaced and superseded by a more general prosperity and material advancement of all the classes of people. The development

of manufactures, the spinning of cotton especially, creating quick, steady, and remunerative markets for the diversified products of agriculture, is giving to the farmers advantages which they have never before possessed.

The farming lands as a rule are divided up into tracts of from 300 to 500 acres. These tracts are usually owned by individual farmers, and constitute what is called an average-sized farm. There are some old estates comprising 3,000 or 4,000 acres, but these are being gradually divided and sold. Many of the white owners, especially in the vicinity of the towns, live upon their farms and personally superintend the working of them; others rent them to responsible planters, who have their care and management.

Practically all the farm labor is colored, the negro tenants living in cabins scattered here and there over the farms. The average-sized farm will have five or six of these cabins. The labor of the colored men is of average efficiency. They can withstand the heat much better than the whites, but to get the maximum amount of work out of them requires the constant oversight of the "boss."

The rents are of two kinds, share rent and "money" rent. Under share rent the landlord furnishes the team, implements, seed, half the fertilizer, house, garden patch, and fuel, and the tenant furnishes the labor. The crops are then divided equally. When money rent is taken, the landlord furnishes nothing but the land and receives 2 bales of cotton, equivalent to about $75, for every 30 acres cultivated. This seems very high rent, considering that the value of the lands is quoted at only $7 to $10 per acre.

The system of farming is largely on the "extensive" rather than the "intensive" plan. This is but the natural consequence, however, of the character of the labor and the cultivation of one crop to the general exclusion of all others. Cotton planting has become so easy and simple, it requires so little individual thought and effort, and the money returns are so direct and certain, and every business, trade, and industry accessory to the work of the farmer has become so systematized and organized in unison with this pursuit that the introduction of new crops and new methods is very difficult.

Red clover and alfalfa have been grown to some extent on the Cecil clay, and both have produced very well. Peanuts, melons, and sweet potatoes are grown with profit on the sandy types. The cowpea, which is indigenous to this region, is profitably employed as an adjunct to the fertilizers used, and also to improve the physical condition of the soil. The extended use of this legume can not be too strongly urged, nor can the use of more manure and better methods of tillage, as substitutes for commercial fertilizers, be too strongly recommended.

The transportation facilities of the area, so far as railroads are concerned, are ample. One line crosses it from east to west, another

from north to south, and a third from northwest to southeast. In no part of the area does a farmer have to travel more than 10 miles to reach the railroad.

The main public roads follow the ridges, thus avoiding the streams and the maintenance of numerous bridges. The roads of Anderson and a part of Greenwood County are kept in better condition than those in other parts of the area.

All the roads are dirt roads. In the summer these are very good, but during much of the winter the farmer is mud bound and unable to reach his market except with a maximum of expenditure of time and effort. If the labor of the short-term convicts now employed in the construction of dirt roads was intelligently utilized in permanent road building with the use of macadam, the results in the end would be far more beneficial. There are plenty of rocks found in nearly every locality, which if crushed would furnish excellent road material. It is a happy coincidence, too, that in the "flat-woods" regions, where the roads become the nearest impassable, the materials for road making are the most plentiful.

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U. S. DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

SOIL MAP

SOUTH CAROLINA
ABBEVILLE SHEET

SOIL PROFILE
(3 feet deep)

Cecil sandy loam — Ssc / C
Durham sandy loam — Ssc / C
Iredell clay loam — Sc / C
Davie clay loam — Ssc / C / C
Cecil clay — Ssc / C
Meadow

LEGEND
Ssc Sandy loam
Sc Loam
C Clay

LEGEND
Cs Cecil sandy loam
Ds Durham sandy loam
Ic Iredell clay loam
Dc Davie clay loam
Cc Cecil clay
M Meadow

Soils Surveyed by
F. W. Taylor and T. D. Rice
1902.

Scale 1 inch = 1 mile
0 1 2 3 4 5

A. Hoen & Co. Lith. Baltimore, Md.

Field Operations
Bureau of Soils
1902.